THAT WHICH IS CLAIMED:

1. A surface inspection system for distinguishing between particle defects and pit defects on a surface of a workpiece, the surface inspection system comprising:

an inspection station for receiving a workpiece;

a scanner positioned and arranged to scan a surface of the workpiece at said inspection station, said scanner including a light source arranged to project a beam of P-polarized light and means positioned to scan the P-polarized light beam across the surface of the workpiece; and

means for detecting differences in the angular distribution of the light scattered from the workpiece and for distinguishing particle defects from pit defects based upon said differences.

2. A surface inspection system as defined in Claim 1, wherein said means for detecting differences in the angular distribution of the scattered light includes means for comparing the amount of light scattered in a direction substantially perpendicular from the surface of the workpiece to the amount of light backscattered from the surface of the workpiece.

3. A surface inspection system as defined in Claim 1, wherein said means for detecting differences in the angular distribution of the scattered light includes means for identifying a dip in the intensity distribution of the scattered light.

4. A surface inspection system as defined in Claim 1, wherein said means for detecting differences in the angular distribution of the scattered light comprises a plurality of collectors positioned and arranged for collecting light at different angles relative to the surface of the workpiece, said collectors each including a photodetector for generating signals in response to the collected light, and means for comparing the signals from photodetectors located at said different angles.

5. A surface inspection system as defined in Claim 4, wherein said plurality of collectors includes a first collector positioned and arranged to collect light components scattered generally perpendicular from the surface of the workpiece, and a second collector positioned and arranged to collect light components scattered angularly from the surface of the workpiece.

6. A surface inspection system as defined in Claim 5, wherein said scanner is positioned and arranged to direct the light beam onto the surface of the workpiece at a predetermined angle of incidence other than perpendicular, and said second collector is positioned and arranged to collect backscattered light components.

7. A surface inspection system as defined in Claim 6, wherein said plurality of collectors additionally includes a third collector positioned and arranged to collect light components forwardly scattered from the surface of the workpiece.

8. A surface inspection system as defined in Claim 6, wherein said scanner is positioned and arranged to direct the light beam onto the surface of the workpiece at an angle of incidence of at least -50° from perpendicular to the workpiece surface.

9. A surface inspection system as defined in Claim 5, wherein said first collector is arranged to collect light components scattered over an angle of approximately ±20° from perpendicular to the workpiece surface.

10. A surface inspection system as defined in Claim 1, additionally including means to form a first map identifying the locations of pit defects on the workpiece surface and a second map identifying the locations of particle defects on the workpiece surface.

11. A surface inspection system as defined in Claim 10, including a video display operatively associated with said means to form said first and second maps for displaying a visual representation of said first and second maps.

12. A surface inspection system for distinguishing between particle defects and pit defects on a surface of a workpiece, the surface inspection system comprising:

an inspection station for receiving a workpiece;

a scanner positioned and arranged to scan a surface of a workpiece at said inspection station, said scanner including a light source arranged to project a beam of P-polarized light at an angle of incidence at least 50 degrees rearward of perpendicular to the workpiece surface, and means positioned to receive the light beam and to scan the light beam along a

predetermined scan path across a surface of the workpiece;

a detector arranged for detecting light scattered from the surface of a workpiece at said inspection station, said detector including a center channel collector positioned and arranged to collect light components scattered substantially perpendicular from the surface of the workpiece, and a back channel collector positioned and arranged to collect light components backscattered from the surface of the workpiece, said collectors each including photodetectors for generating electrical signals in response to the collected light; and

a comparator responsive to electrical signals from the photodetectors of said center channel collector and said back channel collector for detecting differences in the angular distribution of the scattered P-polarized light from the workpiece.

13. A surface inspection system as defined in Claim 12, wherein said inspection station comprises:

a transporter arranged to translationally transport a workpiece along a material path; and

a rotator associated with said transporter and arranged to rotate workpiece during translational travel along the material path.

14. A surface inspection system as defined in Claim 13, wherein said scanner is positioned and arranged to scan a surface of a workpiece during rotational and translational travel along the material path to produce a spiral scan pattern over the surface of the workpiece.

15. A surface inspection system as defined in Claim 12, wherein said comparator includes a first comparer for identifying a defect as a particle if the ratio of the intensity of the center channel photodetector signal to the back channel photodetector signal is less than a predetermined amount.

16. A surface inspection system as defined in Claim 15, wherein said detector additionally includes a forward channel collector positioned and arranged to collect light components forwardly scattered from the surface of the workpiece, said forward channel collector including a photodetector for generating an electrical signal in response to the collected light, and wherein said comparator includes a second comparer for identifying a defect as a pit if the ratio of the intensity of the center channel photodetector signal to the forward channel photodetector signal is more than a predetermined amount.

17. A surface inspection method for distinguishing between particle defects and pit defects on a surface of a workpiece, said method comprising:

scanning a beam of P-polarized light across the surface of the workpiece;

collecting light scattered from the surface of the workpiece; and

detecting differences in the angular distribution of the light scattered from the workpiece and distinguishing particle defects from pit defects based upon said differences.

18. A method as defined by Claim 17, wherein said step of detecting differences in the angular distribution of the scattered light comprises comparing the amount of light scattered in a direction generally perpendicular from the surface of the workpiece to the amount of light scattered backwardly from the surface of the workpiece.

19. A method as defined by Claim 17, wherein said step of detecting differences in the angular distribution of the scattered light comprises identifying a dip in the intensity distribution of the scattered light.

20. A method as defined by Claim 17, wherein said step of detecting differences in the angular distribution of the scattered light includes comparing the intensity of scattered light collected at various angles relative to the surface of the workpiece.

21. A method as defined by Claim 20, wherein said step of detecting differences in the angular distribution of the scattered light includes comparing the intensity of light components scattered substantially perpendicular from the surface of the workpiece to the intensity of the light components scattered angularly from the surface of the workpiece.

22. A method as defined by Claim 17, additionally including forming a first map identifying the locations of pit defects on the workpiece surface.

23. A method as defined by Claim 22, including forming a second map identifying the locations of particle defects on the workpiece surface.

24. A method as defined in Claim 23, including displaying said first and second maps on a video display.

25. A method as defined by Claim 21, wherein said step of scanning a beam across the surface of the workpiece comprises projecting the beam of light onto the workpiece at an angle of incidence of at least 50 degrees from perpendicular to the workpiece.

26. A surface inspection method for distinguishing between particle defects and pit defects on a surface of a workpiece, said method comprising:

receiving a workpiece at an inspection station;

scanning a surface of a workpiece at the inspection station with a beam of P-polarized light at an angle of incidence of at least 50 degrees rearward of perpendicular to the workpiece surface;

collecting light scattered from the surface of a workpiece at the inspection station with a first collector positioned and arranged to collect light components scattered generally perpendicular from the surface of the workpiece, and with a second collector positioned and arranged to collect light components backscattered from the surface of the workpiece;

converting the collected light components from the first collector and the second collector into respective electrical signals; and

analyzing the signals to distinguish particle defects from pit defects.

27. A surface inspection method as defined in Claim 26, wherein said analyzing step comprises identifying a defect as a particle if the ratio of the intensity of the first collector signal to the second collector signal is less than a predetermined amount.

28. A surface inspection method as defined in Claim 27, wherein said collecting step additionally includes collecting light scattered from the surface of a workpiece at the inspection station with a third collector positioned and arranged to collect light components scattered forwardly from the surface of the workpiece and converting the collected light into an electrical signal, and wherein said analyzing step includes identifying a defect as a pit if the ratio of the intensity of the first collector signal to the third collector signal is more than a predetermined amount.

29. A surface inspection method for distinguishing between particle defects and pit defects on a surface of a workpiece, said method comprising:

receiving a workpiece at an inspection station;

translationally transporting the workpiece along a material path at the inspection station;

rotating the workpiece during translational travel along the material path;

scanning a beam of P-polarized light across the surface of the rotating and translationally transported workpiece at an angle of incidence of at least 50 degrees from perpendicular to the workpiece;

collecting scattered light at a first location about perpendicular to the surface of the workpiece and at a second location rearwardly therefrom;

detecting differences in the angular distribution of the scattered light from the workpiece; and

analyzing the detected differences in angular distribution to distinguish particle defects from pit defects.